9: Planetary Geology

Learning Objectives

- Understand the rock cycle.
- Describe three main categories of rocks.
- Describe the surfaces of the four terrestrial planets.
- Describe the origin and properties of planetary magnetospheres.
- Compare and contrast the atmospheres of Earth, Venus, and Mars.

We can take what we have learned about the Earth's interior and combine it with what our probes have told us about the size and densities of these planets, we can construct models about their interiors as well. Mercury, Venus, and Mars formed in much the same way as Earth did, with planetesimals colliding. These collisions would convert the gravitational potential energy of the planetesimals into thermal energy, heating the planets up until they became molten.

These early molten worlds would have undergone differentiation, in which gravity would pull the high-density, material, such as metals, to center. Meanwhile, the lower-density materials such as silicate rocks, would rise to the surface. As the material separated by density, we would expect the other three planets to form similar layers as the Earth, with a core, mantle, and a crust. Since all evidence indicates that the terrestrial planets are all made of similar rocky materials, we can expect them all to behave the same when subjected to the same forces.